Developmental Biology

An International Journal Published under the Auspices of the Society for Developmental Biology

Editor-in-Chief: PETER J. BRYANT

Associate Editors

Eileen D. Adamson
Merton Bernfield
Sanford I. Bernstein
Mina Bissell
Ira B. Black
Mary Bownes
Igor Dawid
Connie J. Eaves
Richard A. Firtel
Joseph Frankel
Scott E. Fraser
H. Robert Horvitz
Alan F. Horwitz
Laurinda A. Jaffe
Gregory Kopf
Story C. Landis
Anne McLaren
Ken Muneoka
Eric Olson
Bruce M. Paterson
Scott Poethig
Rudolf A. Raff
Lynn M. Riddiford
Gerald Schatten
Davor Solter
M. Takeichi
Fred Wilt
Larry Zipursky

Editorial Assistant
Sharon Clark

VOLUME 165, 1994

ACADEMIC PRESS

San Diego New York Boston London Sydney Tokyo Toronto

Copyright © 1994 by Academic Press, Inc.

DEVELOPMENTAL BIOLOGY is a registered trademark
of Academic Press, Inc. (Harcourt Brace & Company)

All Rights Reserved

No part of this publication may be reproduced or transmitted in any form, or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per copy fee through the Copyright Clearance Center, Inc. (222 Rosewood Drive, Danvers, Massachusetts 01923), for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copy fees for pre-1994 articles are as shown on the article title pages; if no fee code appears on the title page, the copy fee is the same as for current articles.

0012-1606/94 $6.00

MADE IN THE UNITED STATES OF AMERICA

This journal is printed on acid-free paper.

Contents of Volume 165

NUMBER 1, SEPTEMBER 1994

Full Papers

FREDRIK TUISKU AND CLAES HILDEBRAND. Evidence for a Neural Influence on Tooth Germ Generation in a Polyphyodont Species 1

SEAN P. COOK, CHARLES J. BROKAW, CHARLES H. MULLER, AND DONNER F. BABCOCK. Sperm Chemotaxis: Egg Peptides Control Cytosolic Calcium to Regulate Flagellar Responses 10

ANDREW J. COPP, IACOB CHECIU, AND JENNIFER N. HENSON. Developmental Basis of Severe Neural Tube Defects in the *loop-tail* (*Lp*) Mutant Mouse: Use of Microsatellite DNA Markers to Identify Embryonic Genotype 20

NATHALIE ALLIOLI, JEAN-LUC THOMAS, YAHIA CHEBLOUNE, VICTOR-MARC NIGON, GÉRARD VERDIER, AND CATHERINE LEGRAS. Use of Retroviral Vectors to Introduce and Express the β-Galactosidase Marker Gene in Cultured Chicken Primordial Germ Cells 30

VINCENT C. HENRICH, A. ALEX SZEKELY, SE JAE KIM, NEIL E. BROWN, CHRISTOPHE ANTONIEWSKI, MELISSA A. HAYDEN, JEAN-ANTOINE LEPESANT, AND LAWRENCE I. GILBERT. Expression and Function of the *ultraspiracle* (*usp*) Gene during Development of *Drosophila melanogaster* 38

KAY OHLENDIECK, JACQUELINE S. PARTIN, ROBIN L. STEARS, AND WILLIAM J. LENNARZ. Developmental Expression of the Sea Urchin Egg Receptor for Sperm 53

THOMAS L. DECKWERTH AND EUGENE M. JOHNSON, JR. Neurites Can Remain Viable after Destruction of the Neuronal Soma by Programmed Cell Death (Apoptosis) 63

MARGARET SOLTYSIK-ESPAÑOLA, DAVID C. KLINZING, KENNETH PFARR, ROBERT D. BURKE, AND SUSAN G. ERNST. Endo16, a Large Multidomain Protein Found on the Surface and ECM of Endodermal Cells during Sea Urchin Gastrulation, Binds Calcium 73

AKIO NISHIKAWA AND HIDEO HAYASHI. Isoform Transition of Contractile Proteins Related to Muscle Remodeling with an Axial Gradient during Metamorphosis in *Xenopus laevis* 86

TOM DUCIBELLA AND JAN BUETOW. Competence to Undergo Normal, Fertilization-Induced Cortical Activation Develops after Metaphase I of Meiosis in Mouse Oocytes 95

RIYI SHI AND RICHARD B. BORGENS. Embryonic Neuroepithelial Sodium Transport, the Resulting Physiological Potential, and Cranial Development 105

ALLAN V. T. WANG, LYNNE M. ANGERER, GREGORY J. DOLECKI, RICHARD LUM, GORDON V. L. WANG, RUBEN CARLOS, ROBERT C. ANGERER, AND TOM HUMPHREYS. Distinct Pattern of Embryonic Expression of the Sea Urchin Cyl Actin Gene in *Tripneustes gratilla* 117

ANNETTE VERTINO-BELL, JIN REN, JENNIFER D. BLACK, AND JOSEPH T. Y. LAU. Developmental Regulation of β-Galactoside α2,6-Sialyltransferase in Small Intestine Epithelium 126

LISA NAGY, LYNN RIDDIFORD, AND KENJI KIGUCHI. Morphogenesis in the Early Embryo of the Lepidopteran *Bombyx mori* 137

HARVEY M. FLORMAN. Sequential Focal and Global Elevations of Sperm Intracellular Ca^{2+} Are Initiated by the Zona Pellucida during Acrosomal Exocytosis 152

QIURONG LIU, FOUAD SHALABY, MIRA C. PURI, SHAOJUN TANG, AND MARTIN L. BREITMAN. Novel Zinc Finger Proteins That Interact with the Mouse γF-Crystallin Promoter and Are Expressed in the Sclerotome during Early Somitogenesis 165

HYE JUNG BAEK, YOUNG JU JEON, HYE SUN KIM, MAN-SIK KANG, CHIN HA CHUNG, AND DOO BONG HA. Cyclic AMP Negatively Modulates both Ca^{2+}/Calmodulin-Dependent Phosphorylation of the 100-kDa Protein and Membrane Fusion of Chick Embryonic Myoblasts 178

TATSUYA UEKI AND NORIYUKI SATOH. As Ascidian Homolog of *SEC61* Is Expressed Predominantly in Epidermal Cells of the Embryo 185

32 299HI XL 977 6/95 31249-202

CLAIR KELLEY, KAREN YEE, RICHARD HARLAND, AND LEONARD I. ZON. Ventral Expression of GATA-1 and GATA-2 in the *Xenopus* Embryo Defines Induction of Hematopoietic Mesoderm 193

BRADLEY J. STITH, RONALD ESPINOZA, DAWN ROBERTS, AND TANYA SMART. Sperm Increase Inositol 1,4,5-Trisphosphate Mass in *Xenopus laevis* Eggs Preinjected with Calcium Buffers or Heparin 206

AMY M. KACHINSKY, JANICE A. DOMINOV, AND JEFFREY BOONE MILLER. Myogenesis and the Intermediate Filament Protein, Nestin 216

CHAI-AN MAO, LIN GAN, AND WILLIAM H. KLEIN. Multiple Otx Binding Sites Required for Expression of the *Strongylocentrotus purpuratus Spec2a* Gene 229

KEIKO MIZUNO, JOSETTE CARNAHAN, AND HIROYUKI NAWA. Brain-Derived Neurotrophic Factor Promotes Differentiation of Striatal GABAergic Neurons 243

CATHERINE THOMPSON-COFFE AND DENISE ZICKLER. How the Cytoskeleton Recognizes and Sorts Nuclei of Opposite Mating Type during the Sexual Cycle in Filamentous Ascomycetes 257

ALFONSO CARRERA, GEORGE L. GERTON, AND STUART B. MOSS. The Major Fibrous Sheath Polypeptide of Mouse Sperm: Structural and Functional Similarities to the A-Kinase Anchoring Proteins 272

Rapid Communications

JANE C. BURNS, TOMOYO MATSUBARA, GRACE LOZINSKI, JIING-KUAN YEE, THEODORE FRIEDMANN, CHARLES H. WASHABAUGH, AND PANAGIOTIS A. TSONIS. Pantropic Retroviral Vector-Mediated Gene Transfer, Integration, and Expression in Cultured Newt Limb Cells 285

BRIAN E. STAVELEY, ROSS B. HODGETTS, SANDRA L. O'KEEFE, AND JOHN B. BELL. Targeting of an Enhancer Trap to *vestigial* 290

ZAHRA ZAKERI, DANIELA QUAGLINO, AND HARLEEN SINGH AHUJA. Apoptotic Cell Death in the Mouse Limb and Its Suppression in the Hammertoe Mutant 294

NUMBER 2, OCTOBER 1994

Reviews

GERALD SCHATTEN. The Centrosome and Its Mode of Inheritance: The Reduction of the Centrosome during Gametogenesis and Its Restoration during Fertilization 299

SHALINA MAHAJAN-MIKLOS AND LYNN COOLEY. Intercellular Cytoplasm Transport during *Drosophila* Oogenesis 336

WILLIAM E. THEURKAUF. Microtubules and Cytoplasm Organization during *Drosophila* Oogenesis 352

DARRYL L. KROPF. Cytoskeletal Control of Cell Polarity in a Plant Zygote 361

MICHAEL W. KLYMKOWSKY AND ALLA KARNOVSKY. Morphogenesis and the Cytoskeleton: Studies of the *Xenopus* Embryo 372

Full Papers

MARTHA J. LUNDELL AND JAY HIRSH. Temporal and Spatial Development of Serotonin and Dopamine Neurons in the *Drosophila* CNS 385

WILLIAM J. SCOTT, JR., ROSEMARIE WALTER, GEORG TZIMAS, JÖRN OLIVER SASS, HEINZ NAU, AND MICHAEL D. COLLINS. Endogenous Status of Retinoids and Their Cytosolic Binding Proteins in Limb Buds of Chick vs Mouse Embryos 397

J. FULKA, JR., R. M. MOOR, AND J. FULKA. Sister Chromatid Separation and the Metaphase–Anaphase Transition in Mouse Oocytes 410

MALAVI T. MADIREDDI, MARIA C. DAVIS, AND C. DAVID ALLIS. Identification of a Novel Polypeptide Involved in the Formation of DNA-Containing Vesicles during Macronuclear Development in *Tetrahymena* 418

THOMAS A. DRYSDALE, KATHRYN F. TONISSEN, KRISTIN D. PATTERSON, MICHAEL J. CRAWFORD, AND PAUL A. KRIEG. Cardiac Troponin I Is a Heart-Specific Marker in the *Xenopus* Embryo: Expression during Abnormal Heart Morphogenesis 432

CHUNG-HAE LEE AND TERUKO TAKETO. Normal Onset, but Prolonged Expression, of *Sry* Gene in the B6.Y^{DOM} Sex-Reversed Mouse Gonad 442

FRANK LAFONT, ALAIN PROCHIANTZ, CÉCILE VALENZA, MAURICE PETITOU, MARC PASCAL, MARTINE ROUGET, AND ANNIE ROUSSELET. Defined Glycosaminoglycan Motifs Have Opposite Effects on Neuronal Polarity *in Vitro* 453

DAKIN WILLIAMS AND K. S. STENN. Transection Level Dictates the Pattern of Hair Follicle Sheath Growth *in Vitro* 469

VOLKER HARTENSTEIN, AMELIA YOUNOSSI-HARTENSTEIN, AND ARNE LEKVEN. Delamination and Division in the *Drosophila* Neurectoderm: Spatiotemporal Pattern, Cytoskeletal Dynamics, and Common Control by Neurogenic and Segment Polarity Genes 480

DEBORAH L. CHAPMAN AND DEBRA J. WOLGEMUTH. Regulation of M-Phase Promoting Factor Activity during Development of Mouse Male Germ Cells 500

ELIZABETH MANSFIELD, EVELYN HERSPERGER, JOSEPH BIGGS, AND ALLEN SHEARN. Genetic and Molecular Analysis of *hyperplastic discs*, a Gene Whose Product Is Required for Regulation of Cell Proliferation in *Drosophila melanogaster* Imaginal Discs and Germ Cells 507

H. R. BRENNER, S. ROTZLER, W. A. KUES, V. WITZEMANN, AND B. SAKMANN. Nerve-Dependent Induction of AChR ϵ-Subunit Gene Expression in Muscle Is Independent of State of Differentiation 527

MATTHIAS HEBROK, KARIN WERTZ, AND ERNST-MARTIN FÜCHTBAUER. *M-twist* Is an Inhibitor of Muscle Differentiation 537

MUSTAFA K. KHOKHA, GABRIEL LANDINI, AND PHILIP M. IANNACCONE. Fractal Geometry in Rat Chimeras Demonstrates That a Repetitive Cell Division Program May Generate Liver Parenchyma 545

CHRISTINA BRENNAN AND JOHN J. ROBINSON. Cloning and Characterization of HLC-32, a 32-kDa Protein Component of the Sea Urchin Extraembryonic Matrix, the Hyaline Layer 556

DANIEL M. VERNON AND DAVID W. MEINKE. Embryogenic Transformation of the Suspensor in *twin*, a Polyembryonic Mutant of *Arabidopsis* 566

TARIQ ENVER, QILIANG LI, KARIN B. GALE, MING HU, GILLIAN E. MAY, JOYCE E. KARLINSEY, GERARDO JIMENEZ, THALIA PAPAYANNOPOULOU, AND FRANK COSTANTINI. Analysis of the Developmental and Transcriptional Potentiation Functions of 5′HS2 of the Murine β-Globin Locus Control Region in Transgenic Mice 574

ANN M. WUNSCH, CHARLES D. LITTLE, AND ROGER R. MARKWALD. Cardiac Endothelial Heterogeneity Defines Valvular Development as Demonstrated by the Diverse Expression of JB3, an Antigen of the Endocardial Cushion Tissue 585

JEANNETTE PHILIPP, PAMELA J. MITCHELL, URSULA MALIPIERO, AND ADRIANO FONTANA. Cell Type-Specific Regulation of Expression of Transcription Factor AP-2 in Neuroectodermal Cells 602

YUJI NAKAJIMA, EDWARD L. KRUG, AND ROGER R. MARKWALD. Myocardial Regulation of Transforming Growth Factor-β Expression by Outflow Tract Endothelium in the Early Embryonic Chick Heart 615

VALÉRIE MEZGER, JEAN-PAUL RENARD, ELISABETH CHRISTIANS, AND MICHEL MORANGE. Detection of Heat Shock Element-Binding Activities by Gel Shift Assay During Mouse Preimplantation Development 627

KAREN H. HALES, JERE E. MEREDITH, AND ROBERT V. STORTI. Transcriptional and Post-transcriptional Regulation of Maternal and Zygotic Cytoskeletal Tropomyosin mRNA during *Drosophila* Development Correlates with Specific Morphogenic Events 639

GENEVIÈVE ALMOUZNI, SAADI KHOCHBIN, STEFAN DIMITROV, AND ALAN P. WOLFFE. Histone Acetylation Influences both Gene Expression and Development of *Xenopus laevis* 654

G. ELISABETH POLLERBERG AND TILL G. A. MACK. Cell Adhesion Molecule SC1/DMGRASP Is Expressed on Growing Axons of Retina Ganglion Cells and Is Involved In Mediating Their Extension on Axons 670

RICHARD T. RICHARDSON, NORIYUKI YAMASAKI, AND MICHAEL G. O'RAND. Sequence of a Rabbit Sperm Zona Pellucida Binding Protein and Localization during the Acrosome Reaction 688

MICHEL DELARUE, KURT E. JOHNSON, AND JEAN-CLAUDE BOUCAUT. Superficial Cells in the Early Gastrula of *Rana pipiens* Contribute to Mesodermal Derivatives 702

HIROKI ODA, TADASHI UEMURA, YOSHITO HARADA, YOUICHI IWAI, AND MASATOSHI TAKEICHI. A *Drosophila* Homolog of Cadherin Associated with Armadillo and Essential for Embryonic Cell–Cell Adhesion 716

Rapid Communications

LIHUA YAO, DAMIN ZHANG, AND PAULETTE BERND. The Onset of Neurotrophin and *trk* mRNA Expression in Early Embryonic Tissues of the Quail 727

TANYA T. WHITFIELD, COLIN R. SHARPE, AND CHRISTOPHER C. WYLIE. Nonsense-Mediated mRNA Decay in *Xenopus* Oocytes and Embryos 731
ROBERT B. NORGREN, JR., AND CHEN GAO. LHRH Neuronal Subtypes Have Multiple Origins in Chickens 735
Author Index for Volume 165 739

NOTICE

The Subject Index for Volume 164 will appear in the December 1994 issue as part of a cumulative index for Volumes 164 through 166.